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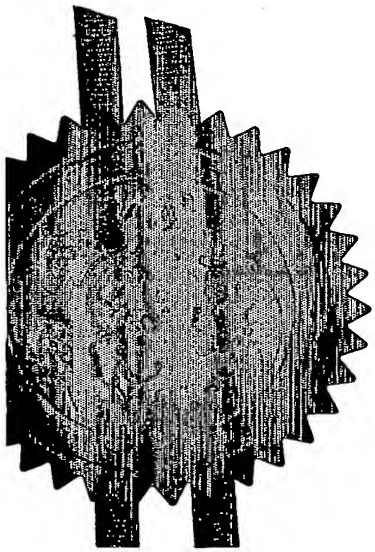

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Dated 6 December 2004

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1. Your reference — P019074GB

2. Patent application number *(The Patent Office will fill in this part)* — 0327372.9

3. Full name, address and postcode of the or of each applicant *(underline all surnames)* — INTELLPROP LIMITED
PO BOX 626
NATIONAL WESTMINSTER HOUSE
LE TRUCHOT ST PETER PORT
GUERNSEY

Patents ADP number *(if you know it)* — 68946040001

If the applicant is a corporate body, give the country/state of its incorporation — A GUERNSBY COMPANY

4. Title of the invention — TELECOMMUNICATIONS SERVICES APPARATUS

5. Name of your agent *(if you have one)* — D Young & Co

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)* — 21 New Fetter Lane
London
EC4A 1DA

Patents ADP number *(if you know it)* — 59006

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Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d)) — Yes

Patents Form 1/77

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Description	13
Claim(s)	0
Abstract	0
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Translations of priority documents	0
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	2
Request for preliminary examination and search *(Patents Form 9/77)*	0
Request for substantive examination *(Patents Form 10/77)*	0
Any other documents *(please specify)*	Facsimile Letter Dated 25 November 2003

11. I/We request the grant of a patent on the basis of this application.

Signature D. Young & Co. Date 25.11.03

D Young & Co (Agents for the Applicants)

12. Name and daytime telephone number of person to contact in the United Kingdom — Adam Pilch — 023 8071 9500

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TELECOMMUNICATIONS SERVICES APPARATUS

This invention relates to the field of telecommunications and in particular to apparatus and methods for setting up a communication between a user of a telecommunications network and a destination.

Users of telephones can directly call other users of telephones, and can also have access to a wide variety of voice services, including network-based services such as Voice mail and information or entertainment services such as live radio feeds, but only if they can obtain the number to dial.

Normally, users access these services by originating a call to the service delivery equipment by dialling a string of digits representing the telephone number of the service. Most people have difficulty memorising more than a few telephone numbers and therefore use various forms of directory to provide a translation from meaningful alphanumeric name to digit string.

Mobile telephones typically have a directory of 'phonebook' facilities which enable telephone numbers and appropriate alphanumeric identifiers to be stored within the handset. These have limited capacity and a required telephone number may not be stored. However, typical fixed line telephone apparatus is not adapted to store names and numbers, and those that are tend to have relatively small storage capacity. Furthermore, if a service is called infrequently the user may not have stored the number, either because of capacity limitations or because future use was not foreseen. Later, when the service is required, obtaining the number from other sources may be difficult, especially if the user is away from home or office.

In another branch of communications, the same problem of using long digit strings to identify Internet websites has been very effectively overcome by allowing users to enter alphanumeric addresses (domain names) of the form "www.companyname.com". Such addresses are translated within the Internet network to the required numeric strings. Furthermore, Internet search engines are available so that when a user cannot

remember or does not know the required domain name, an approximation or keyword can be entered to enable intelligent identification of potentially desired websites.

It would be highly desirable if a similar scheme were available to enable access to telephone services via alphanumeric addresses.

Some attempts to overcome this problem have been made with personal numbers and particularly freephone numbers. For example, generic identifiers in the UK such as 0800 FLOWERS are used to route calls to a specific florist, or (with Intelligent Network number translation facilities) to the florist nearest to the caller. Specific identifiers, such as 0800 TELSIS, can be dialled to reach a particular company or organisation.

In such cases, the organisation 'owning' the alphanumeric address has in fact 'bought' a telephone number where the digits correspond to the letters usually printed on a telephone keypad. Thus 0800 TELSIS is actually 0800 835747. A drawback of this approach is that, because each of the digit keys represents several letters, other organisations may not be able to use the same scheme – for example 0800 VEKRIS is also 0800 835747. Thus utilisation of the significantly increased address space offered by alphanumeric addressing is severely limited. Furthermore the availability of alphanumeric names is limited in some national numbering plans to names that match the standard number length.

Other drawbacks of the '0800 TELSIS' approach include the fact that a number of different layouts for letters on telephone keypads are in use throughout the world. Whilst the situation has been eased in recent times with the introduction of an ISO standard, organisations may still have to promote both alpha and numeric telephone numbers, e.g. '0800 TELSIS (835747)'.

In addition, callers who are not in the 'home' country have difficulty in accessing such numbers. For example, somebody in the Netherlands wishing to call Telsis in the UK would normally have to dial the international access code, followed by the country

code and then the UK telephone number (without the leading zero), i.e. 0044 800 TELSIS. This means that the caller would have to know where Telsis is located and the appropriate country code and number format. On fixed networks, dialling the international access code, followed by one's own country code as a prefix to a destination telephone number is not normally permitted, and the call will fail.

An attempt to overcome these difficulties and restrictions has been made through introduction of the Universal Freephone service in which a logical country code of 800 has been allocated. Thus dialling 00 800 00 TELSIS could allow access to Telsis from any country supporting the Universal Freephone service, but in practice the organisation has to arrange for the particular Universal Freephone number to be activated in every country from which it is prepared to accept calls. The points made above regarding name/number clashes (TELSIS/VEKRIS) and inefficient use of the potential address space are still valid for Universal Freephone, and in addition the caller must remember the exact number format, i.e. 00 800 00 .... in this case.

As can be seen, numeric numbering schemes within the world's telecoms networks are inherently restrictive, resulting in an impaired service to users and reduced network revenues. The restrictions could be overcome with a means to easily use alphanumeric addressing.

As discussed above, it is possible to use alphanumeric representations of telephone numbers but with significant limitations.

Mobile handsets have a facility which can be used to overcome some of these limitations – the Short Message Service (SMS) forming part of the GSM standard enables alphanumeric text messages to be sent to a destination. This destination can be a system including a database which can provide information in response to a query. However these facilities are not widely available on fixed telephone networks, where support for SMS is limited and often restricted to receiving messages from subscribers to only one operator.

Prior art disclosed in EP01308098.1 shows how alphanumeric entry on a mobile user's handset using a text message can be used to initiate call connection by outdial from an apparatus to both the caller and the destination, the destination number being derived from the text message. This is referred to as an 'outdial method'.

Further prior art disclosed in GB9917723.0 shows that alphanumeric entry on the user's handset using a text message can cause the return of a number to the user permitting the user to complete a voice call by normal dialling means. This is referred to as an 'indial method.'

The indial method described requires to user to perform two separate steps, first to send a text message to a well-known service number, and then to make a voice call to a (different) received directory number, which is inconvenient. Furthermore, these methods are restricted to subscribers of networks supporting text messaging, and hence do not cover the vast majority of fixed network customers.

Prior art disclosed in GB0310951.9 discloses alpha name servers used to provide the translation between alpha strings and network addresses in much the same way as Domain Name Servers provide IP addresses from Internet URLs.

Known communication systems include selective call or paging systems which generally use automatic means for sending tone or numeric messages to a receiver and manual means to send alphanumeric messages to an alphanumeric receiver. However, some systems exist which allow letter input from an ordinary MF (multi-frequency) telephone using a predefined code.

As speech recognition capability improves, there exists the possibility of automatic input of textual or spoken messages, but given the large potential vocabulary and large variation found between native speakers this approach is not yet considered fully practicable.

It has also been proposed, for example for use in teletext systems, to use two-digit numerical codes, each representing an individual letter, for input of text messages on a

letter-by-letter basis. However, this is a slow and cumbersome method of composing messages of any significant length, and also requires the user to have access to a table showing correspondence between letters and codes.

A further proposal has involved the use of a telephone keypad having letters as well as numbers. Various standards exist for allocating letters to a numerical telephone keypad, one such being the ISO (International Standards Organisation) standard format. All the standards require a plurality of letters to be associated with each number; for example, the ISO standard associates three or four letters with each number key. The problem that then arises is that, although words can be spelt by means of telephone keypad letter entry (and this entry method is in itself well known), there will be occasions when two or more words will have the same numeric code, in this document such words being referred to as "numnates" (i.e. numerical cognates). As an example, the code 63 would in the ISO format be used for the entry of both "of" and "me". It has been proposed to resolve this difficulty by using published word frequency information and offering the user a word choice based on frequency of use, each word upon request being read back to the user in word frequency order and alternatives offered if necessary. For example, in one set of data relating to word frequency, "of" is ten times more likely to occur than "me". Thus, in compiling the message "call me tonight", the user would enter:

2255# and hear "call"
63# and hear "of"
and hear "me"
866448# and hear "tonight"

It would appear that the need to press the hash (#) key one further time to hear an alternative choice should not impose too much difficulty for message entry. However, the fact that each time that, for example, "me" is required, the system will always offer "of" as a first choice can lead to considerable irritation. Also, although only one extra key needs to be pressed, there is an additional significant delay due to having to hear both words and, more importantly, there is a problem in understanding that arises from the user having heard and transferred to short term memory the apparent phrase "call of me tonight". GB 2307822 and GB 2317982 describe this method of key-input for words using a telephone keypad, together with a predictive improvement that suggests word choices not simply according to word frequency but also according to the context of one or more preceding words.

In the prior art these techniques have been applied to text messaging, i.e. the composition of a communication using text, for subsequent transmission to a network address selected by normal means such as by dialling digits or selecting a phone book entry.

According to the invention there is provided a telecommunications services apparatus and method comprising means for decoding an alphanumeric identifier entered during a voice telephone call, looking up the decoded identifier to determine a network address and connecting said telephone call to the translated network address.

According to the invention there is provided a telecommunications services apparatus and method comprising means for decoding an alphanumeric identifier entered during a voice telephone call by the use of telephone dialling means having number entry and a plurality of letters associated with each of at least some of the numbers, the identifier decoding means comprising a telephony server operable to read back words identified as a number sequence but entered letter by letter by the telephone dialling means, and operable in response to a predetermined input from the telephone dialling means indicating an unwanted word to read back an alternative word associated with the same number sequence, the identifier decoding means being operable to validate a wanted word in response to further input from the telephone dialling means, the identifier decoding means further including predictive means, responsive to at least one preceding entered word to set a list of alternative words in a hierarchy depending on the at least one preceding entered word, the telephony server being operable to read back the complete alphanumeric identifier upon completion of input, the system including optional means for matching the identifier or a variation or derivative thereof to determine a root identifer, means for looking up the identifier or root identifier in a lookup table or name server for the purpose of translating the identifier or root identifier into a translated destination identifier and a destination address, means operable to announce the translated destination identifier to the caller, means operable to request and receive confirmation from the caller and means to outdial to the destination address and connect the voice telephone call to the destination address; passing through the CLI of the caller to the destination.

Referring to **Figure 1**, a fixed telephone user (13) is connected to a telephone network (14). A call is made to the Voice Services Equipment (VSE, 10) which includes service logic and program. A Part of Speech store 15 and a Speech Output means 16

are also included. The VSE is connected to a text processing engine 18. Output from the text processing engine instructs the VSE to dial out to destination telephone (20) or to a voice service (21).

The present invention applies the prior art techniques of text entry using a keypad, preferably in a predictive manner, but uses the entered text not as a text message, but instead as a means of specifying a destination, which in combination with a name server is then able to provide a network address. Unlike the prior art which concerns sending of text messages, these techniques are then applied to the setting up of a voice call. The combination of keypad input of text, a name server for address translation and means for setting up a voice call is novel in the art, and provides unprecedented connectivity between telephone subscribers and potential call destinations.

This solves the main problem that has limited the growth of premium rate telephony services, which is that only the high demand services have been able to fund the continuous advertising required to give the general public access to the telephone numbers that are needed to access these services. If the advertising stops, then the calls stop because users do not know what number to dial. This effectively made even premium rate services unviable for less popular or niche services, because they could not afford the advertising. Now, with the present invention, little or no advertising is required, because the alphanumeric names of organisations, generic and specific services are already known to the public, and these can be dialled by simply entering the required name. Whether the desired service is 'Cricket scores', 'horoscope', 'Nasa news', or 'American Express', the present invention can connect the caller without any telephone numbers being known to the caller. In all cases the CLI of the caller is preferably passed through to the destination telephone, equipment or service.

Operation of predictive text input

In a preferred embodiment, it has been found that, in particular with a restricted vocabulary list such as one including only everyday names, many letter combinations will in fact include just one commonly-used word. For those key inputs that represent more than one word, alternative words can be selected from a list, the order or hierarchy of which depends on one or more preceding entered words. Uniqueness of naming is further improved where the word or phrase list comprises names of companies, organisations, services or products.

In the preferred system, each word is read back following entry to allow the caller the opportunity to correct it or select an alternative. The complete identifier is preferably read back to the caller following translation into a so-called root identifier. Whereas the caller might enter "wimbledon tennis", the system may match this to one of a set of identifiers including for example 'wimbledon', 'wimbledon lawn tennis', 'wimbledon tennis' and translate the entered identifier into a root identifier, for example 'Wimbledon Lawn Tennis' and a telephone number. The preferred system then announces to the caller that he is being connected to Wimbledon Lawn Tennis, and the call proceeds.

The invention will now be described by way of example with reference to the accompanying drawings, throughout which like parts are referred to by like references, and in which:

Figure 1 shows an automated text entry dialling system according to an embodiment of the invention;

Referring to Figure 1 of the drawings, the preferred automated text entry dialling system comprises a telephony server 10 connected to a text processing engine. The telephony server 10 is accessed from a telephone 13 via a telephone network 14.

The telephony server 10 may, for example, be a Telsis Hi-Call, particular features of which are described in International Patent Application Publication No. WO 92/22165. In that publication, the telephony server is referred to as a voice services equipment (VSE). Other terms include voice response system (VRS) or interactive voice response (IVR) equipment. The telephony server 10 provides a line interface, tone detection, voice store and a programmable environment including an appropriate program and data structure.

Associated with the telephony server 10, and optionally forming part of the telephone server 10, are a vocabulary list and part-of-speech (POS) code store 15 and a corresponding speech output means 16. The vocabulary list and POS code store 15 includes a list of text words to be recognised by the system, and corresponding part-of-speech codes associated with the text words, and also a translation table for translating number key inputs into text words. The speech output means 16 has the ability to

provide voice-processed speech output of the words in the store 15, as well as of individual numbers and letters.

Operation of the preferred system will be described by referring to specific examples of word input, these corresponding to the ISO key layout. In general, in the preferred system, to enter a word, it is sufficient to press the keys that contain each of the letters in turn, then to press the hash (#) key.

For example, to enter "OFFICE", the following keys would be depressed: "6 3 3 4 2 3 #". Assuming that the word is in the vocabulary list and speech code store 15 associated with the telephony server 10, the word "office" will be identified from the number key inputs, and the speech output means 16 will cause the system to say "office" as soon as the hash key is activated and will then await the next word.

It may sometimes be necessary to enter numbers, such as for time or date identification purposes. One way is by firstly depressing the star (*) key. For example, to enter "636", the following keys would be depressed: "* 6 3 6 #". The system will say "six, three, six" as soon as the hash key is activated. Alternatively the entered digit string may be offered as one of the list of alternative numnates that is announced in turn as the user presses #, before the "no entry" announcement.

If a desired word is not in the vocabulary list store 15, the system will say "no entry" or similar upon attempted entry. In that case, it is possible to spell the identifier letter by letter; multiple activation of the corresponding key is used, as follows. For example, the number 2 represents 'A', 'B' or 'C' on an ISO keypad. One activation of the key represents 'A', two represent 'B' and three represent 'C'. In order to enter spelling mode, key number 0 (zero) is depressed, whereupon the system will say "spelling" or the like. The code for each letter is then entered, using multiple key activation where necessary. Each time that the hash key is depressed, the system will say the letter and then await the next.

For example, to enter "ESHER", first input "0" to enter spelling mode, then "3 3 #" for 'E', "7 7 7 7 #" for 'S', "4 4 #" for 'H', "3 3 #" for 'E', and "7 7 7 #" for 'R'. Each letter will be spoken back by the system upon each depression of the hash key. At the end of the spelled word, the key "0" is depressed once more, and the system will

confirm by saying "end spelling" or the like. In order to include an apostrophe (') in a word, the number key '1' is depressed.

As indicated above, there are situations in which different common words will have the same code, for example "RAIN" and "PAIN" both have the code 7246. In such cases, upon input of "7 2 4 6 #", the system will say whichever of the words with that code has been predicted to be more likely, as described below. If the spoken-back word is the desired word, the user proceeds to the next word in the identifier to be input in the usual way; if not, the hash key is pressed again, and the system will say the alternative word. If there are more than two possible words, the user continues to depress the hash key until the desired word is spoken. Again, once this has occurred, the user proceeds to the next word in the identifier to be input. When the user comes to the end of the list of words, the system may say "no entry" whereupon the user can continue to press the hash key to hear the list of words again in turn, or may press the key "0" to enter the spelling mode as discussed above, or enter an alternative word.

During identifier entry the user can enter "***" or another code, and the system will speak back the identifier as entered so far. Once the message has been completed, the code "* * #" or another appropriate code is entered, whereupon the system will say the complete identifier and ask the user to confirm or validate the identifier, for example by pressing the key "1" to confirm or the key '0' to reject the message. If '0' is pressed, it is then possible to start with a completely new identifier. If '1' is pressed, the system will confirm acceptance of the identifier, which will then be sent to the text processing engine for matching and translation to a destination identifier and address.

The manner in which words are predicted by the system, in the event that numnates exist, and the method of choosing the ranking of numnates according to the context of one or more previously entered words is described in GB 2317982. The system described therein mentions that the operation of the system can be configured according to the application, for example paging, text messaging or the like. In the present invention, the word entry ranking and prediction is preferably optimised to the entry of the names of companies, products, services and organisations, both specific and generic.

Clearly other methods of entering text broadly along the same lines are possible. A similar method is in common use and available on most mobile telephone handsets.

Text can be entered either one key-press per letter in 'predictive' mode, or in spelling mode where the number of presses cyclically selects a particular character associated with the key. These methods are well known in the art, but are all associated with entering text messages, and are not currently used for entering address specifiers.

The technique described is also applicable to other languages such as German, Italian etc. and also to other alphabets either with appropriate handsets or through the use of templates; in addition the technique can also be used with non-alphabetical languages (e.g. Chinese) that permit alphabetic representation.

In a preferred embodiment, once the user has entered and optionally confirmed his identifier entry, the identifier is passed to a text processing engine that matches the identifier against a stored list of identifiers organised as a lookup table or database. Multiple variants of identifier are preferably stored that all translate to the same 'root identifier' and destination number that represent the destination selected by the user. Optionally confirmation of the translated destination identifier by the user is sought using a voice and DTMF interaction, by playing an audio prompt based on the selected root identifier.

The text processing engine may be a sophisticated 'Wizard' capable of matching by means of classes, exceptions and rules such as is described in GB 0021496.5 or may be a simpler lookup table or database arrangement. In either case, the match result comprises a resolved destination identifier, which is textual, and a network address, which may be a telephone number. In variants of the preferred embodiment, the address may be an email address or other destination type.

Preferably the text processing engine is operable to take account of additional or external factors in its matching decision. For example, by including time of day, day of week or year, CLI, caller location, or other database input, the output of the match may be variable according to circumstances. For example, a user who enters 'Garden Centre' may prefer to be connected to a local garden centre according to his local area code. Where a list of matches is available, the system may interactively provide a choice to the caller, or may select one on the basis of randomness, sponsorship or other method.

In the preferred embodiment, the destination address specifier and the network address, together with the A-number (CLI) of the caller are passed back to the Voice Services Equipment (VSE), which then interacts with the caller to confirm that the destination selected is the one required. To do this the VSE performs a lookup on the textual destination identifier. If a match is not found, then an error announcement may be played to the caller indicating that this destination is not available. If a match is found, then the VSE looks up the file number to play or service to run. The audio played to the caller may be as simple as 'Connecting to HSBC Bank Customer Services' followed by ringing tone as the call is connected, or may be an interactive voice service where the user is provided with choices and navigates by DTMF or spoken commands, eventually being optionally onward routed to a telephone destination. Such interactive services may run on the same VSE, on a VSE accessible via the destination telephone number, or a combination of the two.

A user who enters 'Gardening' may be greeted by an advertising message from a sponsor, before being played some material relevant to the entered topic. Interaction may be provided to allow the user to navigate a menu hierarchy to choose audio material or services. Onward connection to a live agent or organisation may be offered. This concept is known as sponsorship, and is already seen in services such as the speaking clock, and on various radio programs. Audio desired by a user is juxtaposed with audio provided by a sponsor, usually for advertising purposes, and can provide a basis for commercially viable introduction of new services. The present invention is entirely compatible with sponsored and un-sponsored services.

The present invention is to the Telephone network, as the Browser is to the Internet, opening up access to limitless voice services from any fixed or mobile telephone without the requirement to know any network addresses apart from a single number or short-code used to access the service. This single address is analogous to typing 'Google' into a Browser. In a preferred embodiment the access number for the service implementing the invention is 222. On an ISO keypad, this corresponds to the letters ABC, reflecting the simplicity of use of the invention.

A further key application for the invention is envisaged to be the proliferation of voice notice boards. Similar to bulletin boards in the text domain, these permit users to post voice messages on a topic to a notice board, where others with similar interests can retrieve them. Chat rooms are similar but provide live voice chat using a conferencing

bridge. Currently these are limited in scope and availability due to the difficulty of distributing access numbers to interested parties. With the present invention, this is solved because for example someone interested in voice chat about Manchester United Football Club could just dial 222 and enter 'MAN U CHAT' to be connected to a chat system. If a chat room of the appropriate name already exists the caller can be connected. If not a new chat room can be created. Instant connectivity is provided without the need for service specific numbers to be known to the caller. All of the numbers are held in a name server that can be centrally and continually updated.

In so far as the embodiment(s) of the invention described above may be implemented, at least in part, using software-controlled processing apparatus, it will be appreciated that a computer program providing such software control and a storage medium by which such a computer program is stored are envisaged as aspects of the invention.

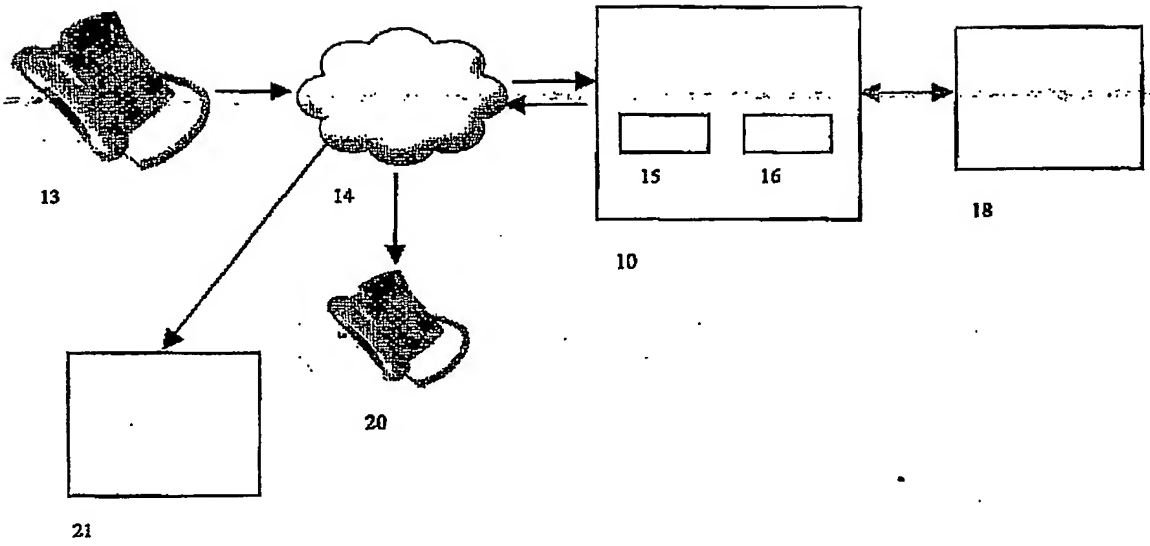

Figure 1

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